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10/583,635	06/20/2006	Rafael Shapiro	BA9327 US PCT	3586

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EXAMINER	
ROBINSON, BINTA M	
ART UNIT	**PAPER NUMBER**
1625	

NOTIFICATION DATE	DELIVERY MODE
10/12/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

PTO-Legal.PRC@usa.dupont.com

Office Action Summary	Application No.	Applicant(s)	
	10/583,635	SHAPIRO, RAFAEL	
	Examiner	Art Unit	
	BINTA M. ROBINSON	1625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *Applicant's remarks filed 6/30/10*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *7/2/10*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Detailed Action

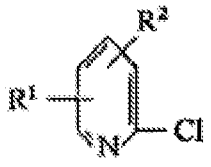
The 103 (a) rejection of claims 1-27 over Maurer et. al. further in view of Bay et. al. and Fessenden is modified below.

(modified rejection)

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maurer et. al. as applied to claims 1-27 above, and further in view of Bay et. al and Fessenden and Navon et. al. and Doyle et. al.

3. Maurer teaches generically that it is well known in the art that aromatic amino-compounds, halogen derivatives can be obtained by means of the Sandmeyer reaction. See page 1, lines 10-15. This would include the production of 2, 3-dichloro pyridines. Maurer teaches this Sandmeyer process generically wherein a 2, 3-dichloro pyridine of the formula 

wherein R1 is hydrogen and R2 is a halogen atom of chlorine from the respective 2-aminopyridines is produced, in which the reaction took place in an organic solvent of a methanolic solution saturated with hydrogen chloride with alkyl nitrites, using the Sandmeyer reaction. See pages 2 and 3. Maurer teaches specifically the preparation of 2-chloropyridines from the corresponding 2-amino-

pyridines – see lines 80-85. The difference between the prior art process and the instantly claimed process, is that 2-chloropyridines rather than 2,3 dichloropyrines are exemplified in the embodiments as being produced by the Sandmeyer reaction from the corresponding 2 amino-pyridines; the second difference is that the use of a copper catalyst in the prior art reaction is not exemplified whereas in the instant reaction, the amount of copper in the copper (II) oxidation state that is present in the copper catalyst as at least 50% in the instant claims. Additionally, in the instant application, other reaction conditions such as the mole ratio of nitrite salt to the 3-amino-2-chloropyridine, and temperature range in the instant process are delineated and overlap with the ranges of reaction conditions specified in the prior art wherein in the prior art, the reaction can take place at a temperature of from 0 to 50 degrees Celsius versus -15 degrees to 20 degrees Celsius in the instant claims and at least 1 mol of alkyl nitrite per mol of amino compound is used as reactants in the prior art process which overlaps with the range claimed in the instant process which is a about 0.95 to 2 moles of nitrite salt to the 3-amino-2-chloropyridine. Fessenden teaches that aniline and other aryl amines can undergo reaction with cold nitrous acid to yield aryldiazonium chlorides (The nitrous acid is usually generated in situe by the reaction of sodium nitrite with HCL). See page 508. Fessenden et. al. also teaches that diazonium salts are highly reactive arising from the excellent ability of N2 to be a leaving group, with the diazonium group being displaced by a variety of nucleophiles, such as halides such as the Cl-. See page 508. Bay teaches that a number of variations of the Sandmeyer reaction are known. See page 2858. Navon et. al., teaches that when Copper (I) complexes are used to

catalyze Sandmeyer reactions, and that the concentration of Cu (I) in the reaction solution is very small and usually unknown due to the low solubility of Cu (I) halides and of CuOH. See page 3536, first paragraph. Doyle et. al. teaches that the use of copper (II) salts in Sandmeyer reactions is effective in minimizing the effect of side reactions and the side products usually obtained in the that compete with the Sandmeyer reaction by reduction of a portion of the copper (II) salt to copper (I) in these processes that compete with the Sandmeyer reaction. See page 2429 of Doyle et. all, lines 3-11. Doyle also teaches that copper (II) halides in reactions of arylamines with alkyl nitrates significantly minimize side products that are usually obtained in the Sandmeyer procedure. See page 2429 of Doyle et. al. In light of the teaching in Navon et. al., which teaches that the Cu (I) in the Sandmeyer reaction is very small in concentration, and in light of the teaching in Doyle that Cu (II) minimizes side products in the Sandmeyer reaction, it would have been obvious to one of ordinary skill in the art to modify the prior art process which is a Sandmeyer reaction to use a copper catalyst with at least about 50% of the copper being in the copper (II) oxidation state, since Cu (II) has been used before in Sandmeyer reactions to minimize side products. In view of Fessenden and in the absence of unexpected results, it would have been obvious to one of ordinary skill in the art to use a 3-amino-2-chloropyridine and convert it to its corresponding aryldiazonium salt by adding nitrite salt and HCL, and then halogenate the pyridine derivative at the 3 position by introducing a nucleophilic chloride ion into the reaction which facilitates the leaving of the diazonium group, to produce the 2,3-dichloropyridine of formula I; since halides such as Cl- are known to displace the

diazonium group in aryldiazonium salts. It is also obvious for one of ordinary skill in the art to optimize the prior art process in terms of specific reaction conditions and use the Sandmeyer reaction, which is a well known synthetic process in the prior art for halogenation of aryl groups, to halogenate a 3-amino-2-chloro-pyridyl compound into a 2, 3-dichloropyridine compound. Accordingly, the claims are rendered obvious by the prior art process.

Response to Applicant's remarks

4. The applicant traverses the 103 (a) rejection of claims 1-27 over Maurer et. al., in view of Bay et. al. and Fessenden et. al. The examiner has modified this rejection to also make it further in view of Navon et. al. and Doyle et. al. to further meet the limitations in the instant claims requiring at least 50% copper in the copper (II) oxidation state. Navon teaches that when Cu (I) is used as part of a copper catalyst in reactions such as the Sandmeyer reaction, that its concentration is very small and usually unknown and that this is problematic for reactions such as the Sandmeyer reaction. See page 3536 of Navon et. al. Doyle et. al. teaches that using copper (II) salts in a Sandmeyer reaction is advantageous for this reaction because it nearly completely eliminates sides products that are usually obtained in the Sandmeyer procedure. See page 2429. In view of the prior art which teaches that Cu (II) nearly eliminates unwanted side products from the Sandmeyer reaction and counteracts side reactions that are competitive with the Sandmeyer reaction, it would have been obvious for one of ordinary skill in the art to modify the prior art process to use a copper catalyst wherein at least about 50 % of the copper is in the copper (II) oxidation state. Fessenden teaches

that aniline and other aryl amines can undergo reaction with cold nitrous acid to yield aryldiazaonium chlorides (The nitrous acid is usually generated in situ by the reaction of sodium nitrite with HCL). See page 508. Fessenden et. al. also teaches that diazonium salts are highly reactive arising from the excellent ability of N2 to be a leaving group, with the diazonium group being displaced by a variety of nucleophiles, such as halides such as the Cl-. See page 508. In view of Fessenden and in the absence of unexpected results, it would have been obvious to one of ordinary skill in the art to use a 3-amino-2-chloropyridine and convert it to its corresponding aryldiazonium salt by adding nitrite salt and HCL, and then halogenating the pyridine derivative at the 3 position by introducing a nucleophilic chloride ion into the reaction which facilitates the leaving of the diazonium group, to produce the 2,3-dichloropyridine of formula I; since halides such as Cl- are known to displace the diazonium group in aryldiazonium salts. It is also obvious for one of ordinary skill in the art to optimize the prior art process in terms of specific reaction conditions and use the Sandmeyer reaction, which is a well known synthetic process in the prior art for halogenation of aryl groups, to halogenate a 3-amino-2-chloro-pyridyl compound into a 2, 3-dichloropyridine compound. Accordingly, the claims are rendered obvious by the prior art process.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binta M. Robinson whose telephone number is (571) 272-0692. The examiner can normally be reached on M-F (9:30-6:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Janet Andres can be reached on 571-272-0670.

A facsimile center has been established. The hours of operation are Monday through Friday, 8:45 AM to 4:45 PM. The telecopier numbers for accessing the facsimile machine are (703)308-4242, (703305-3592, and (703305-3014.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571)272-1600.

/Binta M Robinson/
Examiner, Art Unit 1625

/Janet L. Andres/
Supervisory Patent Examiner, Art Unit 1625